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10/809,916	03/26/2004	Toshihiro Kinoshita	50024-031	6747

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EXAMINER	
MIDKIFF, ANASTASIA	
ART UNIT	**PAPER NUMBER**
2882	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/809,916	KINOSHITA, TOSHIHIRO	
	Examiner	Art Unit	
	Anastasia Midkiff	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 8-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 8-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 8, and 10-13 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Application Publication to Kubota et al. (US 2002/0113241 A1).

With respect to Claims 1, 2, and 8, Kubota et al. teach an organic electroluminescent device (Paragraphs 99-100) comprising:

- a hole injection electrode (Paragraph 100);
- a hole injection layer (Paragraph 100);
- a light emitting layer (Paragraph 100); and
- an electron injection electrode in this order (Paragraph 100), wherein:
    - said hole injection layer includes a first hole injection layer and a second hole injection layer, referred to as the hole-transport layer (Paragraph 100);

- said first hole injection layer having a property of absorbing not less than 10% of ultraviolet light having a wavelength shorter than 380 nm, and including a phthalocyanine-based compound (Paragraph 104);
- said second hole injection layer including a fluorocarbon (Paragraph 146).

The examiner notes that the limitation wherein the second hole injection layer is "formed by plasma chemical vapor deposition" is directed to the method of deposition of the layer and does not affect the structure of the apparatus claimed. Therefore, this limitation is not given any patentable weight in the apparatus claims.

With respect to Claims 10-13, Kubota et al. further teach that:

- said first hole injection layer has a thickness greater than 5 nm and less than 15 nm (Paragraph 150, Line 2); and,
- said second hole injection layer has a thickness greater than 0.5 nm and less than 3 nm (Paragraph 150, Line 3).

Claims 1, 2, 8, and 10-12 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Application Publication to Bazan et al. (US 2004/0142206 A1).

With respect to Claims 1, 2, and 8, Bazan et al. teach an organic electroluminescent device (Abstract) comprising:

- a hole injection electrode (31);

- a hole injection layer (32, 33);
- a light emitting layer (34) ; and
- an electron injection electrode (37) in this order, wherein:
    - said hole injection layer (32, 33) includes a first hole injection layer (32) and a second hole injection layer (33);
    - said first hole injection layer (32) having a property of absorbing not less than 10% of ultraviolet light having a wavelength shorter than 380 nm, and including a phthalocyanine-based compound with a metal center (Paragraph 51);
    - said second hole injection layer (33) including a fluorocarbon (Paragraphs 45-46).

The examiner notes that the limitation wherein the second hole injection layer is "formed by plasma chemical vapor deposition" is directed to the method of deposition of the layer and does not affect the structure of the apparatus claimed. Therefore, this limitation is not given any patentable weight in the apparatus claims.

With respect to Claims 10-12, Bazan et al. further teach that:

- said first hole injection layer (32) has a thickness greater than 5 nm and smaller than 15 nm (Paragraph 54); and,
- said second hole injection layer has a thickness greater than 0.5 nm (Paragraph 49).

Claim Rejections - 35 USC § 103

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bazan et al., as applied to Claim 1 above, and further in view of article to Yu, et al. (15 February 2001).

With respect to Claim 9, Bazan et al. teach most of the elements of the claimed invention, including a first hole injection layer (32) of phthalocyanine with a metal center (Paragraph 51), but does not specifically teach copper as the metal within the complex.

Yu teaches copper phthalocyanine (CuPc) as the hole-injection layer in an organic electroluminescent device, wherein the CuPc enhances the injection of holes in the layer (Abstract, and Page 2347 Column 1 Line 14).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ copper as the metal in the phthalocyanine compound of Bazan et al., to take advantage of the hole injection enhancing properties of CuPc, thereby achieving high electroluminescence performance with lower driving voltage necessary and higher efficiency, as suggested by Yu (Page 2343 Column 1 Lines 11-14, and Page 2347 Column 1 Line 14).

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kubota et al., as applied to Claim 1 above, and further in view of article to Yu, et al. (15 February 2001).

With respect to Claim 9, Kubota et al. teach most of the elements of the claimed invention, including a first hole injection layer of phthalocyanine compound (Paragraph 104), but does not specifically teach copper as a metal within the complex.

Yu teaches copper phthalocyanine (CuPc) as the hole-injection layer in an organic electroluminescent device, wherein the CuPc enhances the injection of holes in the layer (Abstract, and Page 2347 Column 1 Line 14).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ copper as a metal in the phthalocyanine compound of Kubota et al., to take advantage of the hole injection enhancing properties of CuPc, thereby achieving high electroluminescence performance with lower driving voltage necessary and higher efficiency, as suggested by Yu (Page 2343 Column 1 Lines 11-14, and Page 2347 Column 1 Line 14).

Claims 1, 2, 8, 9, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication to Sakakura et al. (US 2002/0153831 A1) and in view of Bazan et al.

With respect to Claims 1, 2, 8, and 9, Sakakura et al. teach an organic electroluminescent device (Paragraph 2) comprising:

- a hole injection electrode (Paragraph 105);
- a hole injection layer (Paragraph 105);
- a light emitting layer (Paragraph 105); and
- an electron injection electrode in this order (Paragraph 105), wherein:

- said hole injection layer includes a first hole injection layer and a second hole injection layer, referred to as the hole transport layer (Paragraph 105);
- said first hole injection layer having a property of absorbing not less than 10% of ultraviolet light having a wavelength shorter than 380 nm, and including copper phthalocyanine (Paragraph 106);

Sakakura does not teach said second hole injection layer includes a carbon-based halide fluorocarbon.

Bazan et al. teach a carbon-based halide fluorocarbon of 2,2',7,7'-tetrakis(diphenylamino)-9,9',-spirobifluorene for the second hole injection layer of an electroluminescent device (Paragraphs 45-46), wherein the fluorocarbon is a material preferred for the layer due to its small ionization potential, high transparency to visible rays, high hole mobility, excellent stability, and low occurrence of generating impurities that would serve as a trap during production or use of the device (Paragraphs 45-46).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ the fluorocarbon material of Bazan et al. in a hole injection layer in the device of Sakakura, to provide a hole-injection layer that has high efficiency due to its material properties, as suggested by Bazan et al. (Paragraphs 45-46).

The examiner notes that the limitation wherein the second hole injection layer is "formed by plasma chemical vapor deposition" is directed to the method of deposition of the layer and does not affect the structure of the apparatus claimed. Therefore, this limitation is not given any patentable weight in the apparatus claims.

With respect to Claim 14, Sakakura et al. teach a method of manufacturing an organic electroluminescent device (Abstract) comprising the steps of:

- forming a hole injection layer on a hole injection electrode (944; see Paragraphs 104-105);
- forming a light emitting layer and an electron injection electrode in this order above said hole injection layer (Paragraph 105); and,
- wherein said step of forming said hole injection layer includes the steps of:
    - forming a first hole injection layer made of copper phthalocyanine having a property of absorbing ultraviolet light (Paragraphs 105-106); and,
    - forming a second hole injection layer on said first hole injection layer by plasma chemical vapor deposition (Paragraphs 104-106).

Sakakura does not teach said second hole injection layer includes a carbon-based halide fluorocarbon.

Bazan et al. teach a carbon-based halide fluorocarbon of 2,2',7,7'-tetrakis(diphenylamino)-9,9',-spirobifluorene for the second hole injection layer of an electroluminescent device (Paragraphs 45-46), formed by vapor deposition (Paragraph 48), wherein the fluorocarbon is a material preferred for the layer due to its small ionization potential, high transparency to visible rays, high hole mobility, excellent stability, and low occurrence of generating impurities that would serve as a trap during production or use of the device (Paragraphs 45-46).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ the fluorocarbon material of Bazan et al. in a hole injection layer in the device of Sakakura, to provide a hole-injection layer that has high efficiency due to its material properties, as suggested by Bazan et al. (Paragraphs 45-46).

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bazan et al. in view of U.S. Patent to Xi et al. (US 6,211,065 B1).

With respect to Claim 14, Bazan et al. teach a method of manufacturing an organic electroluminescent device (Abstract and Figure 3) comprising the steps of:

- forming a hole injection layer (32, 33) on a hole injection electrode (31; see Figure 3);
- forming a light emitting layer (34) and an electron injection electrode (37) in this order above said hole injection layer (Figure 3); and,
- wherein said step of forming said hole injection layer (32, 33) includes the steps of:
    - forming a first hole injection layer (32) made of copper phthalocyanine having a property of absorbing ultraviolet light (Paragraph 51); and,
    - forming a second hole injection layer (33) of fluorocarbon on said first hole injection layer (Figure 3) by chemical vapor deposition (CVD; see Paragraph 48).

Bazan et al. do not specifically teach that the chemical vapor deposition is plasma enhanced.

Xi et al. teach a method of making a thin fluorocarbon film using plasma-enhanced CVD, wherein such method enhances film quality and gap fill performance of the layer (Column 2 Lines 16-30, and Column 4 Lines 12-29).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ plasma-enhanced CVD as the CVD method of Bazan et al. to provide a more uniform layer of film with improved quality, as suggested by Xi et al. (Column 2 Lines 16-30, and Column 4 Lines 12-29).

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kubota et al. in view of U.S. Patent to Xi et al. (US 6,211,065 B1).

With respect to Claim 14, Kubota et al. teach a method of manufacturing an organic electroluminescent device (Paragraphs 99-100) comprising the steps of:

- forming a hole injection layer on a hole injection electrode (Paragraph 100);
- forming a light emitting layer and an electron injection electrode in this order above said hole injection layer (Paragraph 100); and,
- wherein said step of forming said hole injection layer includes the steps of:
    - forming a first hole injection layer made of copper phthalocyanine having a property of absorbing ultraviolet light (Paragraph 104); and,

- forming a second hole injection layer of fluorocarbon (Paragraph 146) on said first hole injection layer by chemical vapor deposition or other techniques (Paragraph 150).

Kubota et al. do not specifically teach that the chemical vapor deposition is plasma enhanced.

Xi et al. teach a method of making a thin fluorocarbon film using plasma-enhanced CVD, wherein such method enhances film quality and gap fill performance of the layer (Column 2 Lines 16-30, and Column 4 Lines 12-29).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ plasma-enhanced CVD as the CVD method of Kubota et al. to provide a more uniform layer of film with improved quality, as suggested by Xi et al. (Column 2 Lines 16-30, and Column 4 Lines 12-29).

Response to Arguments

Applicant's arguments with respect to claims 1, 2, and 8-14 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent Application Publication to Richter et al. regarding OLEDs made with copper phthalocyanine hole injection layer as one of a plurality of hole injection layers.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anastasia Midkiff whose telephone number is 571-272-5053. The examiner can normally be reached on M-F 7-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ASM
6/22/07

EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER